USDA
NATURAL RESOURCES
CONSERVATION SERVICE

MARYLAND CONSERVATION
PRACTICE STANDARD

POND SEALING OR LINING, SOIL DISPERSANT

CODE 521B
(Reported by No.)

DEFINITION

A liner for a pond or waste impoundment consisting of a compacted soil-dispersant mixture.

PURPOSE

To reduce seepage losses from ponds or waste impoundments for water conservation and environmental protection.

CONDITIONS WHERE PRACTICE APPLIES

This practice applies where:

1. Soils are suitable for treatment with dispersants;

2. Ponds or waste impoundments require treatment to reduce seepage rates and to impede the migration of contaminants to within acceptable limits.

CONSIDERATIONS

Consider flattening the slopes of ponds or waste impoundments to facilitate compactive efforts during construction. The stair-step method of construction as outlined in Appendix 10D, Engineering Field Handbook, Part 651, Animal Waste Management Field Handbook may be considered in lieu of slope flattening.

A protective compacted soil cover should be considered for protecting the soil-dispersant liners for ponds.

Consider using a flexible membrane liner for sites that have water depths greater than 24 feet.

Consider the effects on components of the water budget, especially effects on volumes and rates of runoff, infiltration, evaporation, transpiration, deep percolation, and groundwater recharge.

Consider the variability of the practice's effects due to seasonal or climatic changes.

Evaluate the effects on downstream flows or aquifers that could affect other water uses or users.

Assess the effects on the volume of downstream flow to prohibit undesirable environmental, social, or economic effects.

Evaluate potential use for water management to conserve water.

Consider the effects on the movement of sediment, pathogens, and soluble substances carried by seepage toward the groundwater.

Short-term and construction-related effects of this practice on quality of the local and downstream water resources should be evaluated.

Evaluate the effects on wetlands or water-related wildlife habitats.

CRITERIA

General Criteria

Water and waste impoundments to be sealed shall be constructed according to the Maryland conservation practice standards for Pond (Code 378), Waste Storage Facility (Code 313), Waste Treatment Lagoon (Code 359), or other conservation practices standards as appropriate.

Comply with all federal, state, and local laws, rules, and regulations.

Conservation practice standards are reviewed periodically, and updated if needed. To obtain the current version of this standard, contact the Natural Resources Conservation Service.

Dispersant treated soil liners shall be filter compatible with the natural foundation materials on which they are compacted according to Chapter 26, Part 633, of the National Engineering Handbook.

Soil Properties - For chemical sealing, soils shall have properties approximating the following:

1. At least 50 percent finer than 0.074 mm diameter (No. 200 sieve);

2. At least 15 percent finer than 0.002 mm diameter;

3. Less than 0.50 percent soluble salts (based on dry soil weight).

Dispersants - Use tetrasodium pyrophosphate (TSPP) and sodium tripolyphosphate (STPP) in preference to other pholyphosphate salts. Commercial phosphatic fertilizer is not acceptable. Soda ash, technical grade, 99-100 percent sodium carbonate may be used.

These dispersants shall be finely granular; with 95 percent of the material passing a number 30 sieve and less than 5 percent passing a number 10 sieve.

Standard commercial sodium chloride is satisfactory in the granulated form.

Other dispersants may be used in the form found to be satisfactory by local experience.

Protective Soil Layer - In addition to the treated blanket, place at least 2 feet of fine-grained soil over fractured rock outcrop or other highly permeable material.

Safety - Wear a mask and goggles for protection against dispersant dust when applying and mixing the dispersant.

Vegetation - Shape and smooth the finished area and all disturbed areas and stabilize immediately after construction as required on the construction plans, and in accordance with the Maryland conservation practice standard for Critical Area Planting (Code 342).

Additional Criteria Applicable To Waste Impoundments

Design - Design dispersant treated soil liners for waste impoundments in accordance with National Engineering Handbook Series, Part 651, Agricultural Waste Management Field Handbook, Chapter 10, Appendix 10D and/or state regulatory requirements.

Liner Thickness - The minimum thickness of the finished compacted liner is 6 inches.

Liner Protection - Protect the liner against desiccation cracking, the effects of water surface fluctuations, wave action, surface erosion, erosion from pipe inlets, agitation equipment, animals, or items installed through the liner. Design protective measures into the system to protect the liner for these cases. Place as a minimum, at least 6 inches of soil over the soil-dispersant liner.

Additional Criteria Applicable to Ponds

Application Rate - In the absence of laboratory tests or field performance data on soils similar to those to be treated, the minimum application of dispersant per 6-inch thickness of constructed liner is:

Dispersant Type	**Application Rate** ***(lbs/100 ft^2)***
Polyphosphates	7.5
Soda Ash	15

Liner Thickness - In the absence of more detailed testing and analyses, the minimum liner thickness is:

Water Depth ***(feet)***	**Liner Thickness** ***(inches)***
8 or less	6
8.1 – 16	12
16.1 – 24	18
24.1 – 30	24

SPECIFICATIONS

Plans and specifications for dispersant treated soil liners for ponds and waste impoundments shall be in keeping with this standard and will describe the requirements for applying the practice to achieve its intended purpose. Include such drawings, specifications, material requirements, quantities, construction requirements, equipment requirements, and other documents as are necessary to describe the work to be done.

Construction

Clear the area to be treated of all vegetation and trash and all stones or other objects large enough to interfere with operation of the compacting equipment.

The moisture content of the soil must be near optimum for compacting.

Distribute sealing chemicals evenly over the surface to be treated with a drill, seeder, or fertilizer spreader or by hand broadcasting. If broadcast by hand, the area must be staked or otherwise marked in grids of 100 square feet.

Thoroughly mix the chemicals into the 6 to 8 inch thick layer of soil being treated. Mix chemicals into the soil with a disk, rototiller, pulverizer, or similar equipment. A second mixing shall be perpendicular to the first mixing.

If the moisture is inadequate for maximum compacting, add water by sprinkling during the mixing operation. If the soil moisture content is too high, dry by air and disking.

Protect treated areas from puncture by livestock trampling. Protect areas near the normal waterline and at points of concentrated surface flow into the pond against erosion.

Sediment coagulating chemicals, such as gypsum or iron sulfate, shall not be used to clear reservoir water after treatment.

OPERATION AND MAINTENANCE

Address in the Operation and Maintenance plan the operation and maintenance requirements for the conservation practice being lined.

Maintenance activities required for this practice consist of those operations necessary to prevent damaging the treated soil liner. This includes, but is not limited to, excluding animals and equipment from the treated area, protection of the liner during initial filling, agitation, or pumping operations, and repair of disturbed or eroded areas.

SUPPORTING DATA AND DOCUMENTATION

Field Data and Survey Notes

The following is a list of the minimum data needed:

1. System plan sketch;
2. Topographic survey of the site showing elevations and control features;
3. Soils investigation showing seasonal high water table, location of test holes, and gradation and classification of soils to be sealed.

Design Data

Record on appropriate engineering paper. For guidance on the preparation of engineering plans see Chapter 5 of the EFH, Part 650. The following is a list of the minimum required design data:

1. Statement concerning location and type of leaks or excessive permeability and description of foundation preparation to be made;
2. All required permits and documentation on file with the design information;
3. Plan view including, location map, all system components, material and construction specifications;
4. Rate of application and thickness of the treated blanket, method of mixing materials, method of compaction and protection, construction drawings, and component details;
5. Quantities estimate;
6. Job class on plan;
7. Details of foundation drainage, when required;
8. Planting plan. This must meet the criteria, specifications, and documentation requirements of the Maryland conservation practice standard for Critical Area Planting (Code 342).

Construction Check Data/As-built

Record on survey notepaper, SCS-ENG-28, or other appropriate engineering paper. Survey data will be plotted on plans in red. The following is a list of minimum data needed for As-builts:

1. Documentation of site visits on CPA-6. Include the date, who performed the inspection, specifics as to what was inspected, all alternatives discussed, and decisions made and by whom;
2. Actual dimensions of installed lining;
3. Verification of adequate foundation preparation;
4. Documentation of installation of foundation drainage;
5. Certification by the manufacturer that the material is suitable for the intended use, Certification statement from the contractor(s) that they have constructed the liner in accordance with the plans and specifications;
6. Statement on seeding and fencing;
7. Final quantities and documentation for quantity changes, and materials certification;
8. Sign and date checknotes and plans by a person with appropriate engineering approval authority. Include statement that practice meets or exceeds plans and NRCS practice standards.

REFERENCES

1. USDA, Natural Resources Conservation Service. *Engineering Field Manual, Chapter 4, "Elementary Soil Engineering" and Chapter 11, "Ponds and Reservoirs;"*

2. USDA, Natural Resources Conservation Service, *Maryland Field Office Technical Guide, Section IV, Standards and Specifications*;

3. USDA, Natural Resources Conservation Service. *National Engineering Handbook, Chapter 26, Part 633*.

4. USDA, Natural Resources Conservation Service. *National Engineering Handbook, Part 651, Agricultural Waste Management Field Handbook, Chapter 10, Appendix 10D*.